APEC SCSC Education Guideline 1 - Case Studies and Strategic Model Curriculum -

(Final Draft)

ICES 3rd Workshop
at NIST Gaithersburg, Maryland USA
Feb 21, 2008

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KSA 한국표준협회

My duty in KSA, ISO, APEC

- KSA
  - Senior Standards Analyst
  - Standards R&D Team
  - ITS/RFID standards APEC, ASEM
- In Korea
  - Secretariat of TC204K, SC17K, RFID SC, u-T SC
- ISO TC204 (ITS)
  - Korean Delegates 2001~
  - Editor, ISO TR 28682
  - Liaison, APEC TPTWG
  - Repporteur, u-CITY TF
- APEC TPTWG
  - Korean Delegates 2002~
  - Proponent/Editor, APEC TPT 04/2005 Word Report for ITS Standards (2005~6)
- APEC SCSC
  - Korean Delegates 2003~
  - Proponent/Editor, CTI APEC Strategic Standards and Conformance Education Program Phase I, II (2007~9)
- ASEM SCA
  - Korean Delegates 2003

Contents

- Phase I project output (90%)
- Phase II, III project Plan(5%)
- Collaboration Ideas (5%)

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Contents (Project phase I)

A. Project Survey Questionnaire (11p)
B. National Strategy on Standards Education (8p)
C. Summary List of 118 Standards Education Practices (16p, distributed)
D. Detailed Fact Sheets of 88 Standards Education Practices (171p)
E. Surveyed Lessons Learned (25p)
F. Contact Information for Standards Education (20p)

1. Background and Objectives

Preface ~ p.2

What is APEC CTI SCSC?

1. Asia Pacific Economic Cooperation
2. Committee on Trade and Investment
3. Sub-Committee on Standards and Conformance
4. Project Advisory Group on Education

In APEC

- Sep 2005 regular agenda (Korea)
- Feb 2006 agreed to take actions
- Nov 2006 Joint Ministerial Statement
- Nov 2006 approval of education project
  (Korea + China, Indonesia, Japan Thailand, Singapore, USA, Vietnam)
- Nov 2006 revision of APEC SCSC ToR
- Jan 2007 project Phase I initiated

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2006 SCSC I Agreement on standards education

- APEC/CTI/SCSC
  - Sub-Committee on Standards and Conformance under APEC Committee on Trade and Investments
- SCSC I – Feb 2006 (Hanoi, Vietnam)
  - The SCSC agreed to take actions, to promote the inclusion of Standards and Conformity Assessment and related activities in the curricula of schools and universities in the APEC region.
  - Where relevant, this would be done in conjunction with relevant APEC fora with responsibility for educational matters.

2006 APEC Joint Ministerial Statement

THE EIGHTEENTH APEC MINISTERIAL MEETING

HA NOI, VIET NAM

15-16 November 2006

JOINT STATEMENT

(page 8/29)

Ministers recognized the importance of standards education and encouraged members to develop reference curricula and materials to address the significance of standards and conformance to trade facilitation in the region.

APEC Strategic Education Project - overview -

- Title
  - APEC Strategic Education Program on Standards and Conformance
- Proposing Economy: Korea
- Co-Sponsoring Economies: China, Indonesia, Japan, Singapore, Thailand, USA, Vietnam
- Time Plan: Three Phases Projects
  - Mar 2007 to Aug 2010 (42 months)
- Final Budget for 2007 was approved
  - 2008 proposal is under discussion and will be approved by APEC BMC Aug 2008

APEC Strategic Education Project
- Purpose and Objectives –

- The purpose of this project is:

  To develop education model on standards and conformance to increase public awareness mainly in higher education systems and to build capacity in a more strategic and comprehensive manner.

- The key objectives or expected outcomes will include:

  1) Case Studies (Phase I)
  2) Strategic Model curricula (Phase I)
  3) Standards Education Textbooks (Phase II)
  4) Teaching manuals (Phase II)
  5) Implementation guideline (Phase III)
  6) Pilot Implementation (6~8 economies, Phase III)
  7) Lesson Book (after pilot implementation, Phase III)

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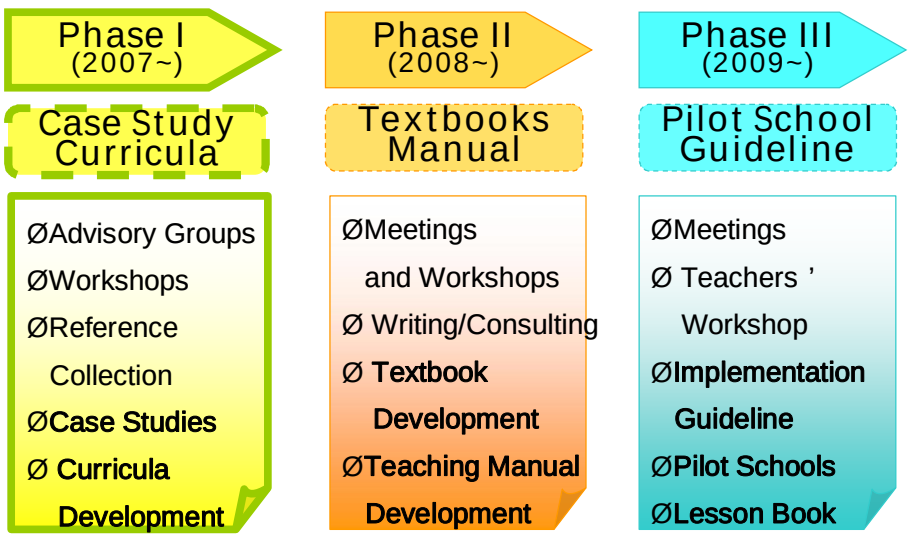
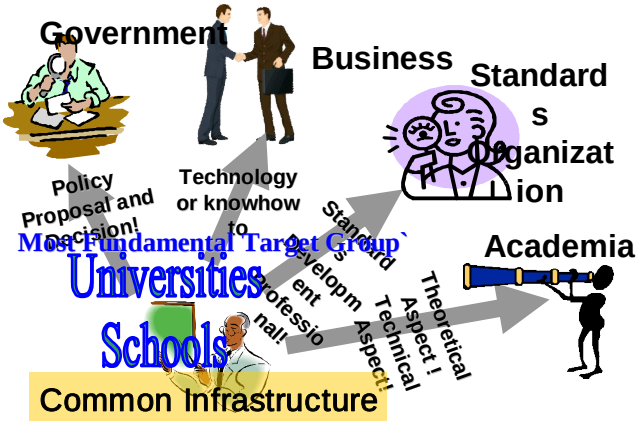
APEC Strategic Education Project
- Project Strategies -



Would be IDEALISTIC

- Why education? It would be idealistic if students are educated in schools and universities



But REALITY is

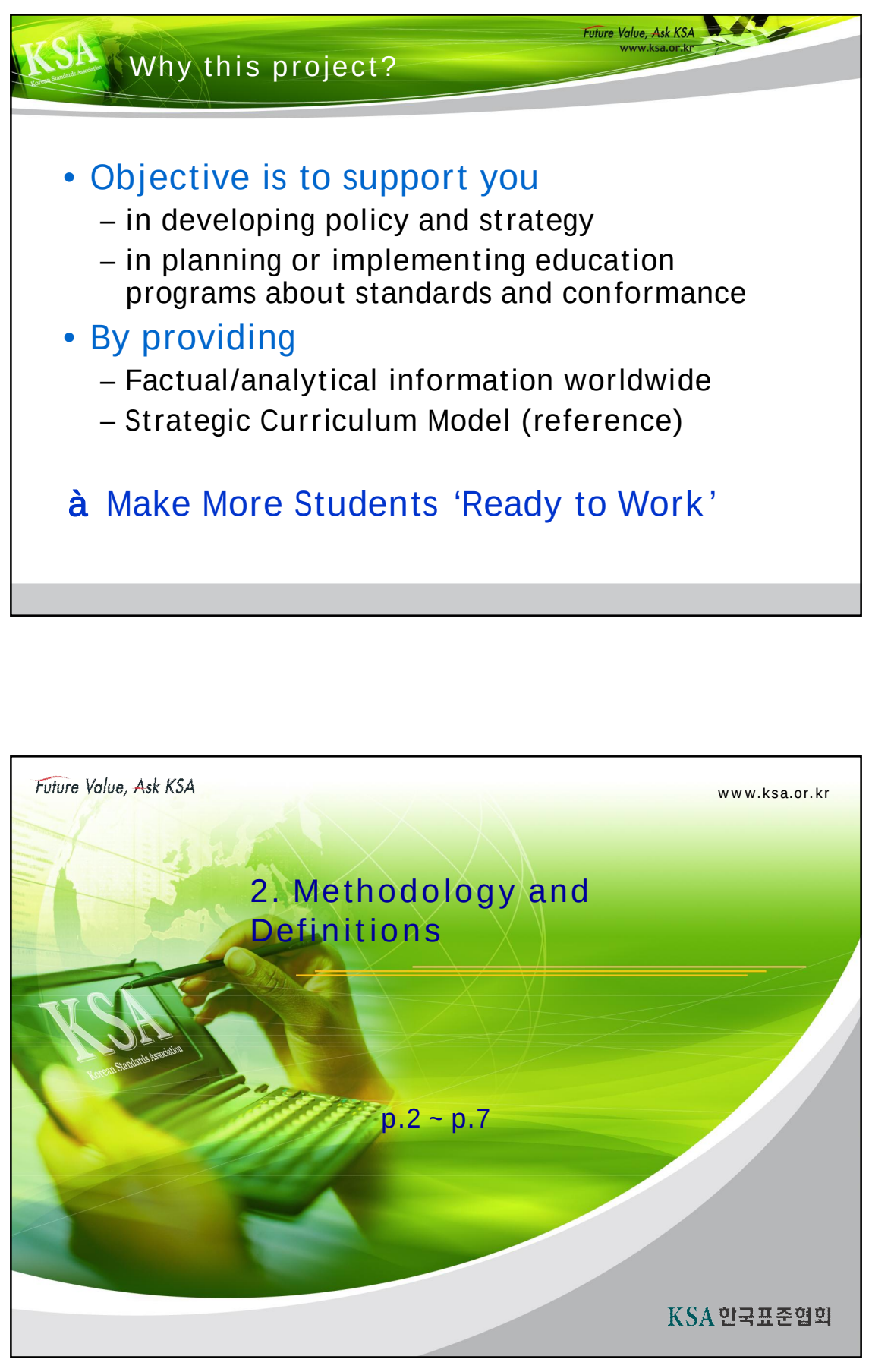
- Rarely heard or recognize..

- ‘Not ready to work’ in professional life

Why this project?

- Objective is to support you
  - in developing policy and strategy
  - in planning or implementing education programs about standards and conformance
- By providing
  - Factual/analytical information worldwide
  - Strategic Curriculum Model (reference)

à Make More Students 'Ready to Work'



2. Methodology and Definitions

p.2 ~ p.7

Survey plus Research

- Survey (60%)
  - 21 APEC Member Economies (16 responses)
  - Several personal contacts (10 responses)
- Research (40%)
  - To complement the survey (comprehensive)

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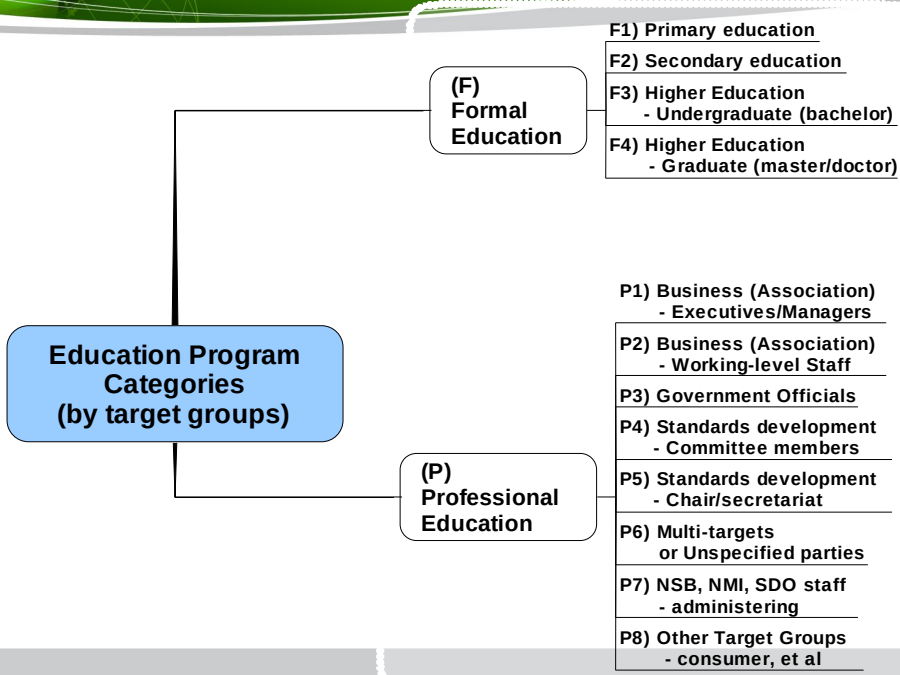
Fundamental Questions

Classification	Questions	Detailed Items
Part I. National Strategy and Priority	1.1 National Strategy	1.1.1 Having strategy in general? 1.1.2 Having education strategy? 1.1.3 If having education strategy - Increase public awareness? - Facilitate professional education? - Facilitate formal education? - Build networking among stakeholders? - Develop web based database? 1.1.4 Contact points for education in general? 1.1.5 Plan to include education in strategy?
	1.2 National Strategy Committee	1.2.1 Having standardization committee? 1.2.2 Having standardization education committee? Work scope, objectives? 1.2.3 Contact points for the education committee?
	1.3 National Priority	Priority: Not Specified, Medium, High Activity: None, Plan, Developing,
Part II Experiences and Lessons Learned	2.1 List of Experiences	Completed or In-Operation in 2006~2007 - Operator, website, Title (program/project), Type(target groups), Note
	2.2 Fact Sheets of Experiences	Detailed information about the list of experiences - Title, weblink, Operator, Type(target groups), Learning objectives, Number of participants, Operation Summary, Textbook
	2.2A Lessons Learned	Lessons learned in planning or deploying education programs/projects - Title , Date, Context, Lessons, Source, Contact
	2.3 Important Literature	Relevant literature about standardization strategies, value, case studies, or textbook

Classifications – target group



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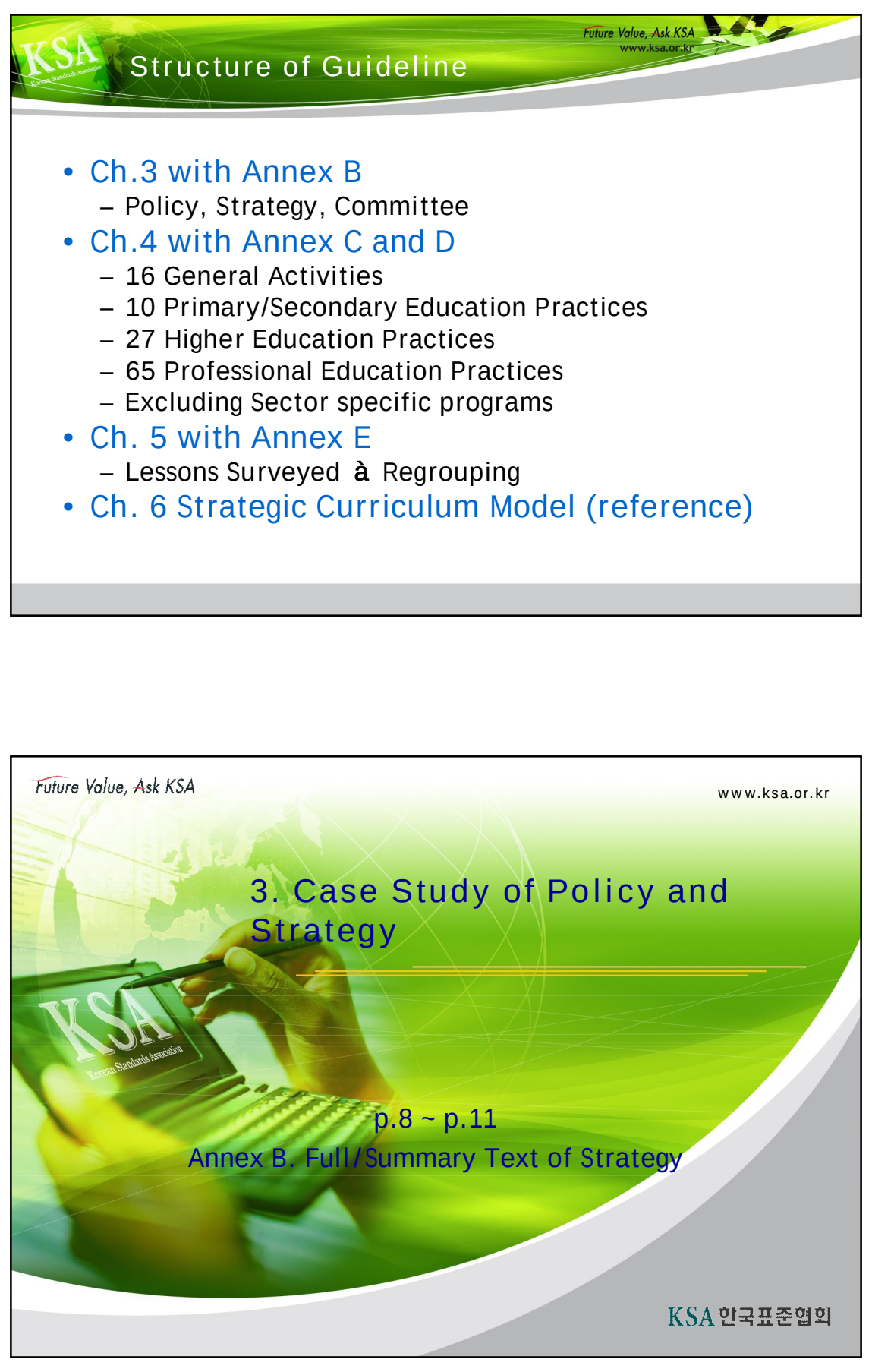
Terms and Definitions

- Classification of Education Programs
  - Formal and Professional Education
- Acronyms
  - Organizations
  - Programs
  - Et al

Structure of Guideline

- Ch.3 with Annex B
  - Policy, Strategy, Committee
- Ch.4 with Annex C and D
  - 16 General Activities
  - 10 Primary/Secondary Education Practices
  - 27 Higher Education Practices
  - 65 Professional Education Practices
  - Excluding Sector specific programs
- Ch. 5 with Annex E
  - Lessons Surveyed à Regrouping
- Ch. 6 Strategic Curriculum Model (reference)

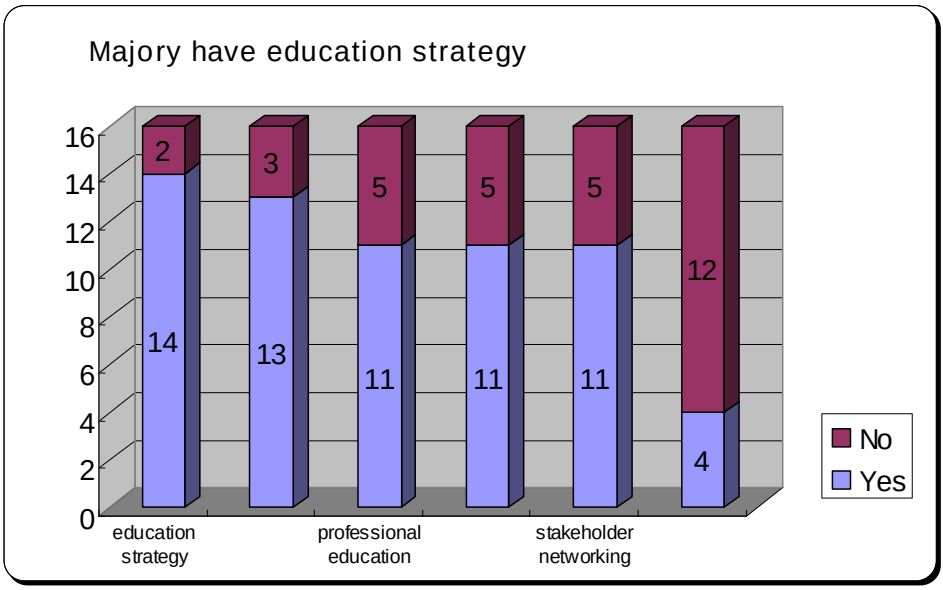


3. Case Study of Policy and Strategy

p.8 ~ p.11

Annex B. Full/Summary Text of Strategy

3.1 Majority recognize the importance



3.2 More detailed or inclusive Strategy needed

<Level of details>		Limited(General)	Wide(Broad)
	← Specific (Detailed)	Canada Chinese Taipei	Japan (*link only) Korea USA Vietnam
	Brief (General) →	China Chile Malaysia	Canada Hong Kong Singapore
		<Level of broadness>	

<Figure 4> Different Levels of Strategy

3.2 Good Practices

à Selected Text from Education Strategy ß

Establish department of standardization in universities in order to build education infrastructure.

- Annex B.6 (Korea)

Encourage universities and colleges within the United States to create standardization education programs in fields of study such as engineering, science, technology, government and public policy, business, economics and law.

- Annex B.12 (USA)

Set up and implement appropriate education/training programmes on standards and conformance in academic and professional institutions such as: universities, colleges, vocational/technical schools, etc

- Annex B.13 (Vietnam)

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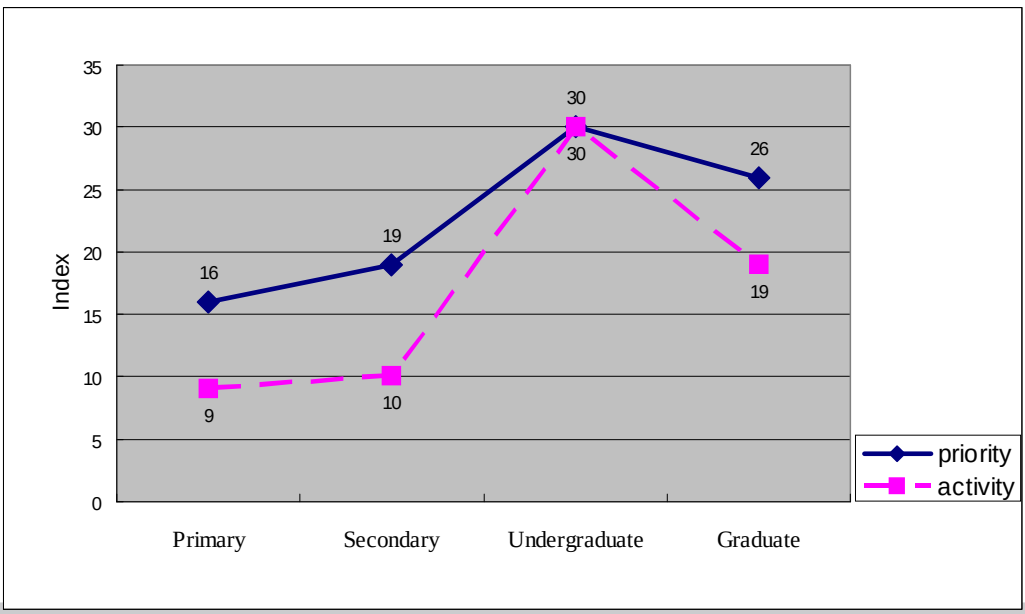
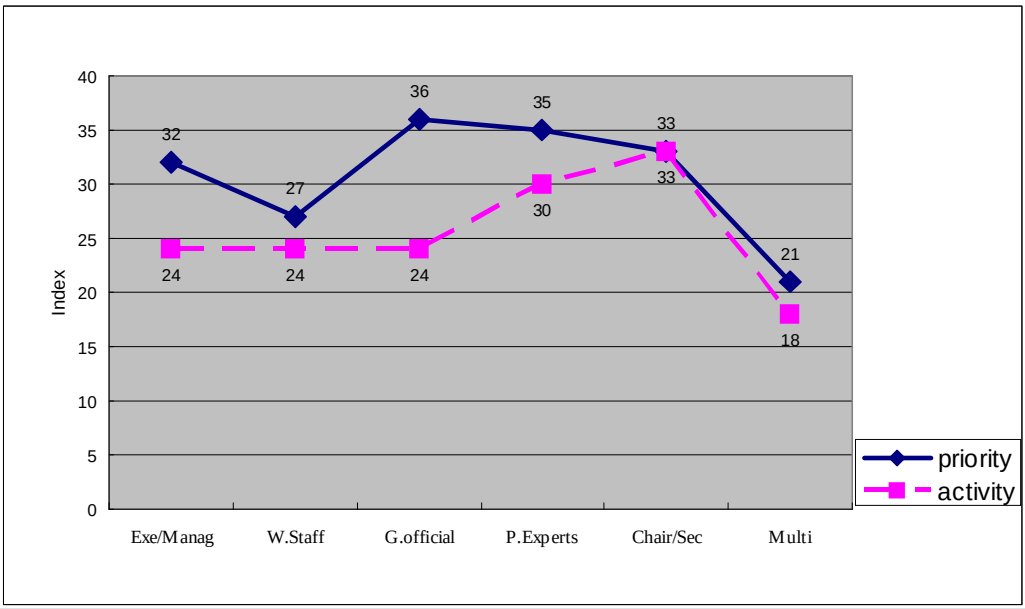
3.3 Priority to Undergraduate Students



3.3 Priority to Officials and Experts



3.4 Education Committee

<Education Strategy?> (chapter 5.1)	Official Education Committee?	
	Not exists/available	Exist
Exist	China Hong Kong Singapore Thailand	Canada Japan Korea Malaysia Chinese Taipei USA Vietnam
Not exists	Australia Brunei Darussalam Chile Indonesia Philippines	none

3.4 Selected Text for Committee

à Selected Objectives of Education Committee ß

The purpose of the committee is to introduce the basics of standards and the process of standardization to university students.

- ***CSA Committee on Standards and Education (Canada) -***

To embark on activities to enhance awareness and promote the importance of those standards among consumers; and to ensure that consumers are given adequate and timely information, knowledge and awareness on standards

- Malaysian Association of Standard Users (Malaysia) -

Advising KSA in developing strategy for and in implementing the university edustandardization program on standards (UEPS).

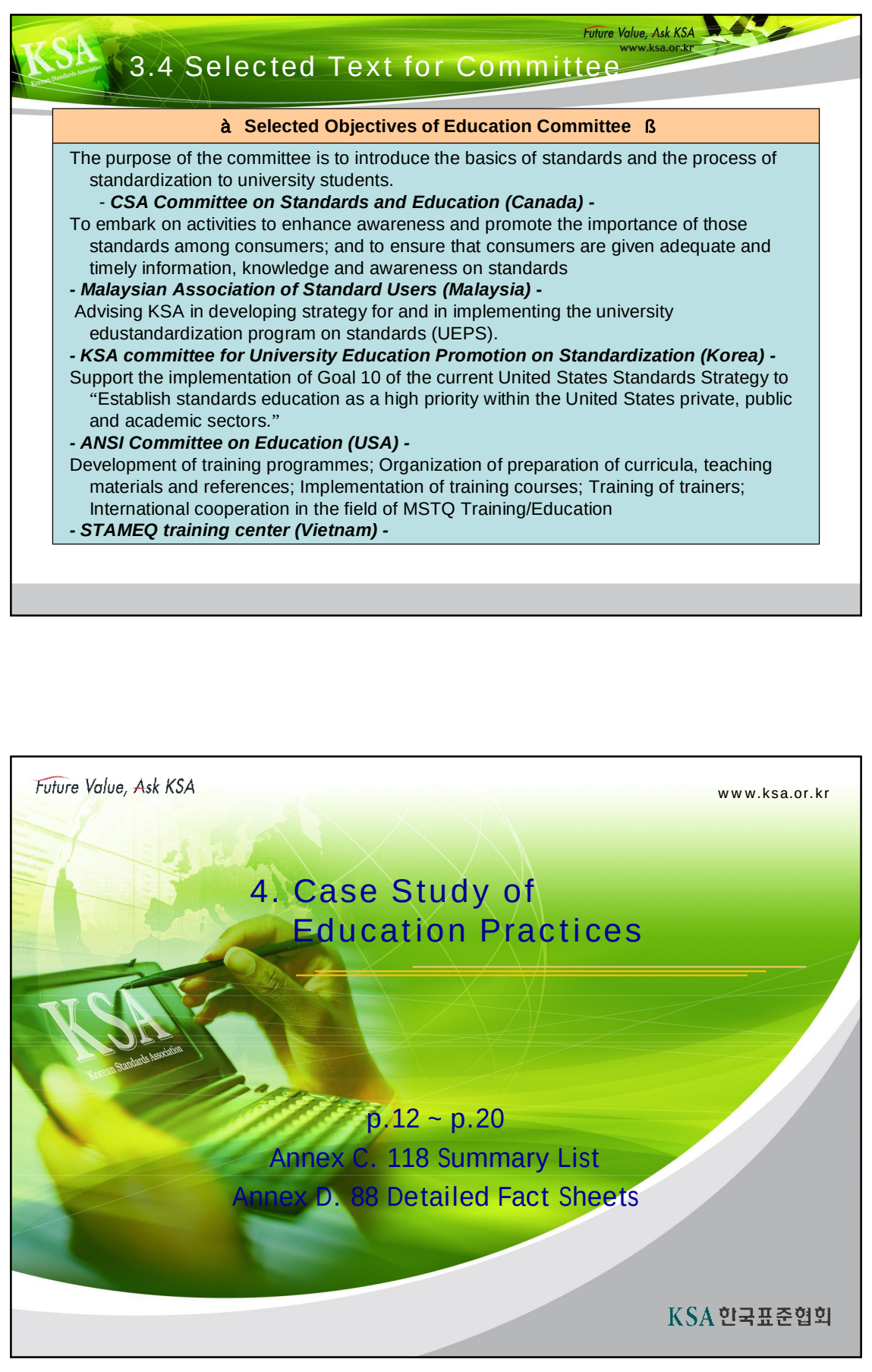
- KSA committee for University Education Promotion on Standardization (Korea) -

Support the implementation of Goal 10 of the current United States Standards Strategy to "Establish standards education as a high priority within the United States private, public and academic sectors."

- ANSI Committee on Education (USA) -

Development of training programmes; Organization of preparation of curricula, teaching materials and references; Implementation of training courses; Training of trainers; International cooperation in the field of MSTQ Training/Education

- STAMEQ training center (Vietnam) -



4. Case Study of Education Practices

p.12 ~ p.20

Annex C. 118 Summary List

Annex D. 88 Detailed Fact Sheets

4.1 More Activities by International Organizations

- ISO award for Higher Education in Standardization (2007) - SO created this award to encourage and recognize successful programs in higher education on standardization. – *ISO (Annex C#114)*
- IEC Lecture Series I(2005) and II (2007) – *IEC (Annex C#114, #115)*
- IEC Challenge – 'International Standardization as a Strategic Tool', comprising the commended papers from the IEC Centenary Challenge. – *IEC (Annex C#112)*
- Cooperation between ITU-T and Universities - Regular Consultation Meetings and online Information Exchange – *IEC (Annex C#112)*
- IFAN WG16 Education and training - To support and promote initiatives in education and training in the standardisation field at international, regional and national levels
  – *IFAN (Annex C#113)*
- COPRAS website is providing education-like information about ICT standards-making to European Union-supported research projects - *CEN, W3C, et al(Annex C#106)*

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4.1 More Activities by International Organizations

- APEC Strategic Standards and Conformance Education Project – Phase I – Case Studies and Curricula Development, Phase II – Textbook Development
  - *APEC (Annex C#103, #104)*
- UNECE Recommendation "I" Methodological studies and education
  - *UNECE WP6 (Annex C#103, #104)*
- Standards Engineering Society (SES) has established a certification program to recognize persons who have demonstrated a high degree of professional competence in different areas of standards. - *SES (Annex C#117)*
- EURAS wants to help change this situation and supports the development of standardization curricula by providing a platform and opportunities for the discussion, development and exchange of teaching material. - *EURAS (Annex C#107)*
- International Committee for Education about Standardization - The first international forum about standardization education. *Formalization is under discussion in 2008.
  - *ICES (Annex C#108)*

4.2 Primary/Secondary - Ten Practices

#No	Target	Economy Org.	Operator	Title	Method F.Sheet
1	F1) F2)	Japan	METI	Standards Education Delivery Service (Lectures on Demand)	Survey Annex D1
2	F1) F2)	Korea	KSA	Standards Olympiad	Survey Annex D2
3	F2)	Korea	KSA	Textbook Sub-chapter Development for Secondary School Students	Survey
4	F2)	Philippines	BPS	Standards Blitz – Standards in the Curricula of Secondary and Alternative Learning Education	Survey Annex D3
5	F2)	Philippines	BPS	Standards Blitz – Standards' Essay Writing Contest (including Teacher)	Survey Annex D4

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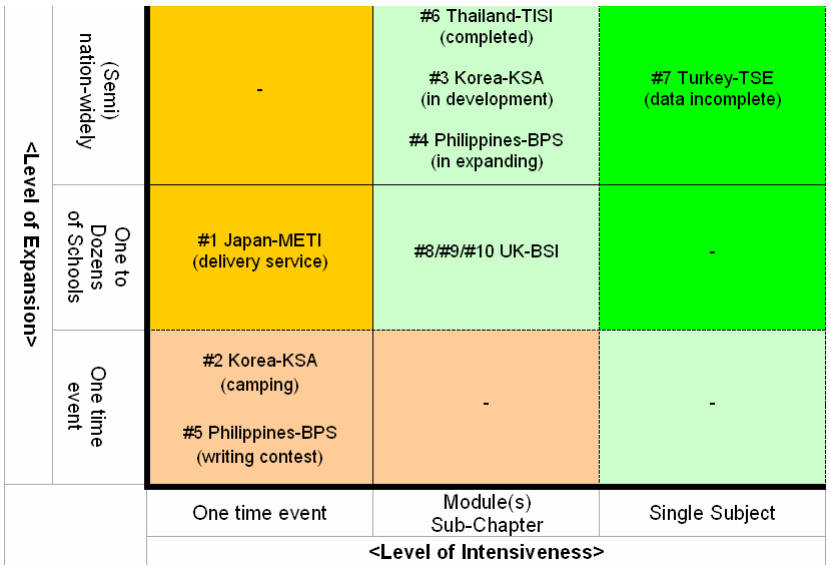
4.2 Primary/Secondary - Ten Practices

6	F2)	Thailand	TISI	The Project on Integrating Standardization in Education (including teachers)	Survey Annex D5
7	F2)	Turkey	TSE	Standardization and Quality	Research Annex D6
8	F1)	UK	BSI	BSI's Education Programme Primary (Age 7-11) Online Information	Research Annex D7
9	F2)	UK	BSI	BSI's Education Programme Secondary (Age 11-14) Online Information	Research Annex D8
10	F2)	UK	BSI	BSI's Education Programme Secondary (Age 14-19) Online Information	Research Annex D9

4.2 Comparison by Level of Intensiveness and Expansion

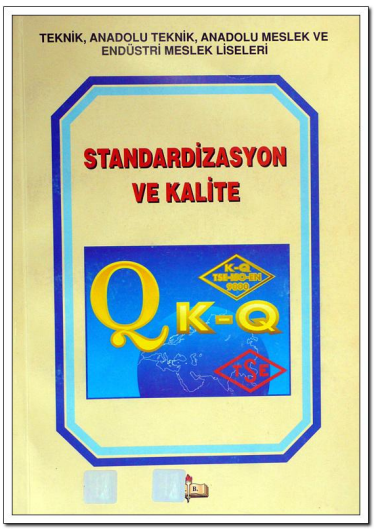


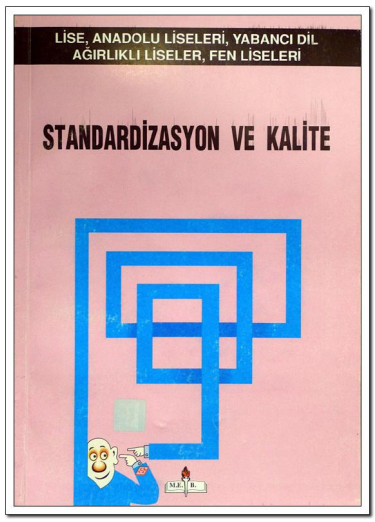
4.2 Turkey and Thailand

- Exceptional is Turkey (#7)
  - as they developed a textbook for a single subject. Verification about detailed operation is needed as the information in gained in phone conversation.
- Outstanding is Thailand (#6)
  - as they operated nationwide program for four years, and around half a million secondary school students participated in the program. Its detailed operation methods and various types of contests are good practices for all. This program is considered as best practice of leadership and cooperation between standards institution and education ministry. For details, please see Annex D5.

4.2 Thailand

4.2 Turkey





4.2 Korea, Philippines, Japan

- Like the cases of Korea (#3) and Philippines (#4), developing modules or a chapter is a good realistic strategy
- Easy and smart approach is organizing an event to involve many students in a contest (#5) or a mixture of contest plus lectures (#2)
- education on demand service (#1) seems to be a creative niche approach

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4.2 Korea - Olympiad

4.3 Higher Education – 17 selected Courses

# No	Target	Economy Org.	Operator	Title	Method F.Sheet
12	F3)	China	CJLU	CJLU-SQM program for bachelor's degree	Research AnnexD10
13	F4)	China	CJLU	CJLU MEE and TTMM course for Master's degree	Research AnnexD11
17	F4)	EC(EU)	Helmut Schmidt-Univ, et al	EU-Asia Link -Standardization in companies and markets	Research AnnexD12
18	F4)	Egypt	PQI	PQI's programmes for post graduate degrees (PQI's programme)	Research AnnexD13
19	F4)	France	Univ of Techn of Compiegne	Master's degree in quality management (MQ) Master's Programme NQCE(Normalization, qualite, certification et essays)	Research AnnexD14
20	F4)	France	ZFIB	Standardization as a tool for Competitive Intelligence	Survey AnnexD15
21	F4)	France	ZFIB	Standardization as a tool for Openness	Survey AnnexD16
22	F3)	Indonesia	BSN	Development of curriculum for education on standardization	Survey

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4.3 Higher Education – 17 selected Courses

				Standardization	
23	F3) F4)	ISO	ISO DEVCO	Development Manual 4 - Teaching of standardization on institutions of higher learning	Research AnnexD17
24	F4)	Japan	JSA	Standardization for business solution	Survey AnnexD18
25	F4)	Japan	Tokyo Univ	Graduate school of Technology Management (MOT)	Research AnnexD19
26	F3)	Korea	KSA	KSA-Far East University Standardization Program "Global Standards Strategy" (for Computer Engineering Students)	Survey AnnexD20
27	F3)	Korea	KSA	University Education Program on Standardization(UEPS)	Survey AnnexD21
28	F3)	Netherlands	RSM Erasmus U	Business Administration - Standardization Strategy	Survey AnnexD22
29	F4)	Netherlands	RSM Erasmus U	Standardization Management, et al	Survey AnnexD23
30	F4)	Sri Lanka	Univ of Moratuwa	MBA in Management of Technology / Quality Management & Standardization	Survey AnnexD24
34	F4)	USA	Catholic University	School of Engineering - Engineering Management Program	S+Research AnnexD26

4.3 Higher Education

curriculum? Is it transferable to other institutions?

<Level of Expansion>		One Subject	Multi Subjects - a few subjects/thesis-	Multi Subjects - degree/program -
	Multi Universities	#27 Korea-KSA UEPS #17 EU-Asia Link #23 DEVCO(dormant)	#13 China-CJLU	#12 China-CJLU
	One University	#20.#21 France-ZFIB #24 Japan-JSA #30 Univ Moratuwa #34 USA-Catholic	#26 Korea–FEU(multi) #25 Japan-T.U(multi) #28/#29 Neth-RSM (thesis, optional)	#18 Egpyt – PQI #19 France – U.C.
		<Level of Intensiveness>		

4.3 Higher – Most Intensive (degree)

- Most intensive and impressive case is CJLU (China Jiliang University, #12).
  - providing seven different courses and two additional special courses.
  - In total, 592 students graduated in 2003-2006 and surprisingly more than 90% of them are working in the field of standardization
- Other two intensive courses are
  - PQI's program for post graduate degrees in Egypt (#18), and University of Technology Compiegne's courses in France (#19).
  - The two courses are covering variety of standardization, quality management, certification and metrology.

4.3 Higher – Intensive (multi -subjects)

- The graduate courses of CJLU
  - MEE, TTMM, provides three subjects
  - about thirty graduates every year
- Stimulating cases are MOT and MBA
  - MOT in Tokyo University (#25) - *strategic management of industrial standardization and intellectual property*
  - MOT/MBA in RSM Erasmus University (#30). - *Standardization Management* *thesis

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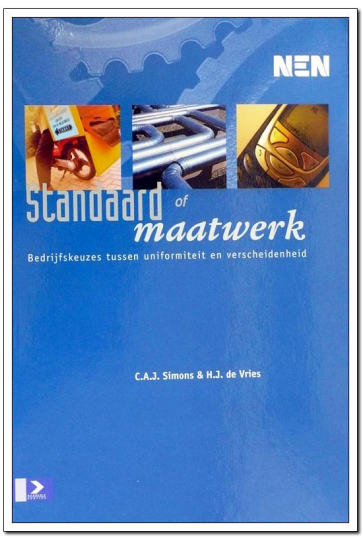
4.3 Higher – Intensive (multi -subjects)



4.3 Higher – one subject

- A smashing success is Korea's UEPS (#27)
  - Semi-nationwide outreach
  - Common textbook '*Future Society and Standards*'
  - Team-teaching arrangement
  - Database, Various types of students
  - KSA assists universities to prepare syllabus and to arrange speakers
- EU-Asia Link (EC funded project)
  - Eye opener of 718 page textbook (2006)
  - eLearning platform for graduate school
- ISO DEVCO
  - Development Manual 4 '*Teaching of standardization on institutions of higher learning' (1987)*

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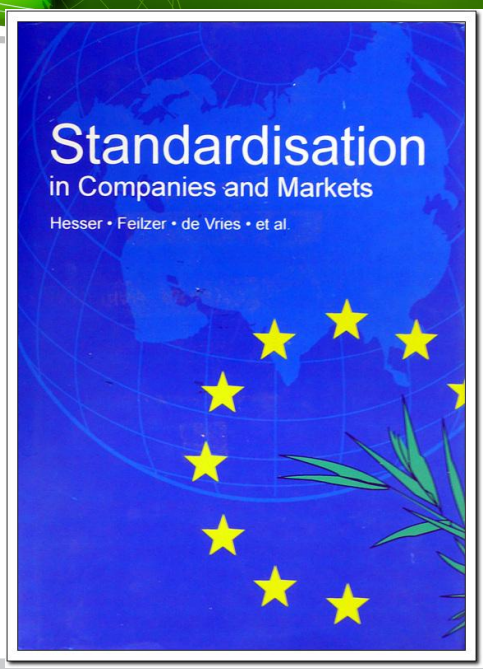
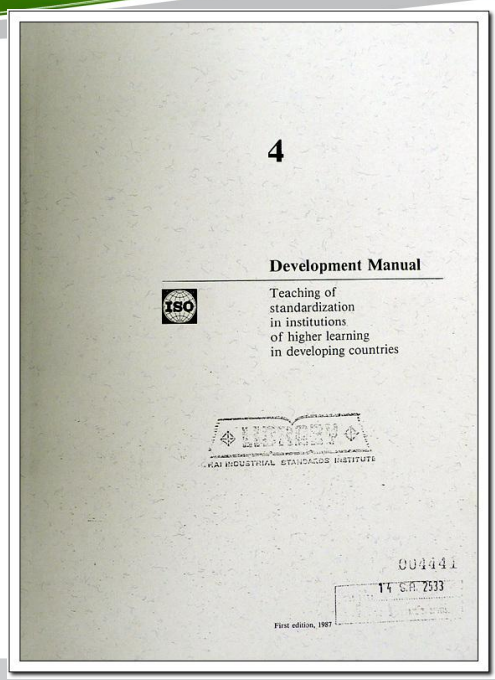
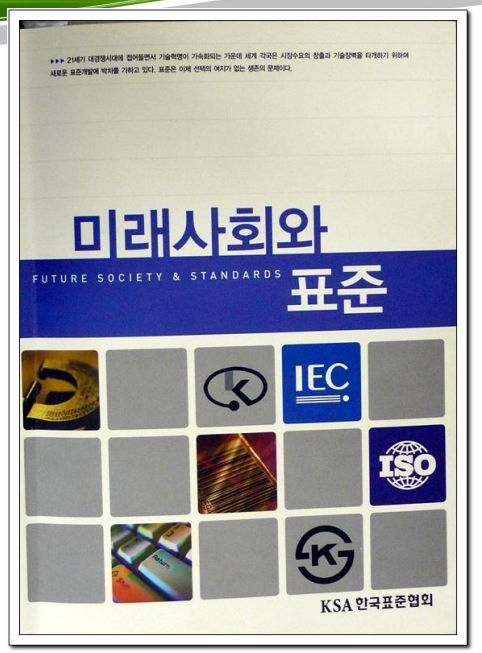
4.3 Higher – EU, ISO





4.3 Higher - Korea



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4.3 Higher - one subject

- Catholic University (#34)
  - '*Strategic Standardization*' for graduate students in engineering
  - Requires student to prepare a research paper related to standardization which consists 90% of students' course achievement.
- ZFIB course (#20, #21)
  - '*Standardization: a tool for Competitive Intelligence*'
  - '*Standardization: a tool for Openness*' for graduate engineering students
- JSA's MBA program (#24)
  - '*Standardization for business solution*' course for MBA student
  - 18 hour short course with team-teaching method.
- University of Moratuwa (#29).
  - '*Quality Management & Standardization*' in MBA in Management of Technology Program
  - Suggested suitable for Management of Technology and Information Technology.

4.3 Higher – module of graduate course

- Noteworthy enough is that six graduate courses (F4)
  - Tokyo Univ, RSM Erasmus, Catholic, ZFIB, JSA and Moratuwa
  - Targeting for graduates students in engineering, MOT or MBA
  - As Strategic Management tool.

- Interdisciplinary characteristics
  - Standardization is interrelated with technology, management, administration and its education is better accepted when to be discussed with academic theory and business practices together.

à At graduate level, standards education seems to be fitting well as part of graduate program such as MOT or MBA curriculum.

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4.4 Professional – Skill set oriented

- Many done by SDOs, NSBs in various fields
- To clarify what is common or different between formal and professional education.
- Majority are to build particular capacity or skills based on awareness raising
- Based on the 65 practices in #38 to #102 of Annex C, we attempted to classify the activities or skills
  - No.1 to No.7 are for skills in special positions or tasks.
  - No.8 to 14 are general (contents for any target)

4.4 Professional – Skill set oriented

No	Topics or Skills	Main Target Groups	Relevant practices
1	Conformance Skills – test, assessment, and documentation	NMI, laboratories Biz experts	#81
2	Administration of standardization activities	NSB, NMI, SDOs Committee chair/sec	#48, #49, #82, #85
3	Standards for technical regulations or legislation	Government officials NSB, NMI, SDOs	#38, #53, #67, #89, #100
4	Communication skills – chairing/moderating a meeting	Committee chair/secretariat	#78, #86, #99
5	Working across cultures – cultural differences	Committee chair, secretariat, members	#52, #76
6	Developing/Drafting standards – template	Committee members Biz experts	#45, #49, #53, #70, #79
7	Specific industry/technology standards or their aspects	Specific Industry experts	#54, #59, #77, #93, #97

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4.4 Professional – Skill set oriented

8	Communication skills – language (English)	All Committee members	#52
9	Communication skills – consensus, negotiation, discussion	All Committee members	#52, #72
10	Standards Development Procedures	Committee members Biz experts	#39, #45, #74, #75, #79
11	Standardization Process, Practices in general	All Committee members	many including #40, #60, #101, #102
12	Structure of national standardization system	All Committee members	#41, #42, #65, #83, #88, #89, #91, #95
13	Structure of international standardization system	All Committee members	#42, #51, #80, #87
14	Basics, Fundamentals about standardization	All	(many including #39,#84, #90, #92, #94)

5. Surveyed Lessons

p.21 ~ p.27
Annex E

5.1 Clear Objectives and Target Oriented

- Target Groups:
  - Formal Education vs. Professional Education
  - Primary/Secondary vs. Undergraduate vs. Graduate
  - Engineering vs. Social Science (Higher Education)
  - Biz Executives vs. Engineers/Researchers vs. Gov. Officials vs. NSB staff
- Objectives and Program:
  - General Awareness vs. Special Expertise
  - Teach what to know vs. Teach what to do
  - One day vs. Two days Vs. A week; One semester vs. Two semesters
  - Elective vs. Required (Compulsive)

5.1 Clear Objectives

à Lessons Learned ß

Understand Different needs by Target Groups. We should understand that the interest and attitude are different from target groups (Primary/Secondary vs. Univ vs. Biz vs. Gov). Accordingly, we should consider seriously the difference in planning and implementing education program about appropriate hours, level of details, objective, curriculum, textbook, teaching Methods.

- Annex.E.16 (APEC – SCSC PAGE recommendations - Lesson #2)

ULU has found through its experiences educating individuals overseas that transposing programs, content and teaching methods utilized in the United States in some international situations does not always yield the same positive results. Programs need to be tailored to the audiences involved, particularly with respect to cultural differences..

- Annex.E.16 (USA – UL University - Lesson #2)

The content of the subject needs to be changed in order to make it easier to understand and more useful in the Sri Lankan context.

- Annex.E.7 (Sri Lanka – University of Moratuwa)

When teachers lecture technical college students, they should take into account the students' special knowledge.

- Annex.E.1 (Japan – METI)

Have clear objectives. With unclear objectives, education program might go different ways. If the objectives are mixed with "exposing students to standard itself" and "train students for making specialists", the curriculum would be messed up as well as students get confused. Have clear objectives, then it would be much easier to make further plans..

- Annex.E.5 (Korea - KSA – UEPS Program – Lesson #2)

5.2 Make Teaching Materials Sexy

à Lessons Learned ß

Most difficult is to attract students. At first glance the topic seems to be dull. Once students get acquainted with standardization and understand its importance they become enthusiastic. I have no real solution yet to solve this problem.

- Annex.E.6 (Netherland – Erasmus University)

Definitions, concepts, examples, exercises, experiments, materials, stories, photographs, and images were used for the students to understand easily.

- Annex.E.2 (Philippines – BPS in DTI)

Students are MTV generation. They are accustomed to visualized education materials. Also, for teaching materials, visualized education materials such as case pictures, colorful PPT slides, and moving pictures are very effective.

- Annex.E.5 (Korea - KSA – UEPS Program – Lesson #4)

Choice of colours for presentation – not text heavy and legible. an improve sessions through posters, display tables, video presentations etc. during breaks.

- Annex.E.9 (Malaysia –Association of Standards Users – Methods, Materials)

Make textbook and teaching materials interesting. Do not teach what you know well (e.g. ISO process), but what the students could be interested/excited.

- Annex.E.16 (APEC – SCSC PAGE recommendations - Lesson #3)

The ICES 2007 Workshop participants expressed sympathy that the content itself and the presenting way of content be FUN and SEXY in any classes of education on standardization.

- Annex.E.19 (ICES – 2nd Workshop)

5.2 Make Teaching Materials Sexy

- Not happy, but you will agree that at first glance 'standards and conformance' are not charming or attractive
- 'how can we make it more attractive before and during the education classes' is fundamental and long term task
- it is general but natural that the initial target to make a course more attractive is to make textbook and relevant teaching materials interesting.
  - Simple, easy and colorful presentations
  - Images/posters/photos
  - Stories, exercises, experiments
  - Multimedia tools – audio or video clips, movies

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5.3 Preferred are 'Daily Life Examples or Case Studies

- Standards in daily life:
  - Example standards used in daily lives such as A4, MP3, Container, et al
  - Keep balance between practical examples and theoretical lecture
  - Provide trainer's own experience
- Case studies, and case studies:
  - Case studies proving the significance of standards, preferably in monetary value, in trade, regulations and businesses.

5.3 Preferred are 'Daily Life Examples or Case Studies'

à Lessons Learned ß

Participants found that they learnt most from practical exercises than from the theoretical presentations given and requested more practical exercises be given.
Using examples from the trainers own experience was received well by participants
- Annex.E.11 (Australia – Standards Australia Training – paragraph #1, #2)
When the course is theoretical it is not well received- the students want examples of the real life.
- Annex.E.4 (France – ZFIB)
Actual sample of commodities/products are effective to attract students.
- Annex.E.1 (Japan - METI)
Feature actual case studies of how companies have benefited from the use of standards; Feature benefits in terms of monetary value, such as cost savings, revenue etc.
- Annex.E.13 (Singapore – SPRING)
Some participants find very useful about 'standards in daily lives'
- Annex.E.9 (Malaysia –Association of Standards Users – from comments)
Business cases are essential, mainly when built and developed by the students
- Annex.E.4 (France – ZFIB)
Participants prefer to learn through 'Case studies' than mere theory only.
- Annex.E.7 (Sri Lanka – University of Moratuwa)
It is clear that 'CASE STUDIES' are one of the most useful and attractive tools to deal with standardization issues. A Good case study could be highlighted with various important aspects of standardization, such as economics, business management tool, patent, de jure vs. de facto, et al. One good example case discussed in the workshop was RAMBUS among others.
- Annex.E.19 (ICES – 2nd Workshop)

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5.4 Exciting is 'Learning by Doing'

- Learning by doing – Contest
- Learning by doing – Group activities:
  - Group brainstorming, discussion, debate
  - Group Problem-solving for standardization
  - Peer teaching
- Learning by doing – Simulations/role-playing:
  - Role playing: proponent, supporter, moderator, opponent
  - Simulating standardization meeting (chair, secretariat, delegates)

5.4 Exciting is 'Learning by Doing'

à Lessons Learned ß
Participants in the training learnt a great deal from experiencing 'Standardization in action' for example attending committee meetings and participating in planning exercises etc. ***- Annex.E.11 (Australia – Standards Australia Training)*** A simulation tool to simulate the debates and have the consensus issue well understood should be a good idea. ***- Annex.E.4 (France – ZFIB)*** Quiz and group works are effective to attract students. ***- Annex.E.1 (Japan - METI)*** Students have found the teaching method (product/painting contests) fairly successful. ***- Annex.E.3 (Thailand - TISI)*** The session most participants find very useful are: - Games, Slides and group activities ***- Annex.E.9 (Malaysia –Association of Standards Users – from comments)*** Also, a SIMULATION EXCERCISE is pointed out to be a cheerful mechanism. A memorable case is the program developed by ISO. ISO has developed an e-learning course which uses a teaching case, a simulation, for educating experts participating in ISO standards development process. The participants of this course takes play the role of national delegates of a imaginary country "Southistan" and simulates the standardization meeting. This kind of mock meeting of standardization, would also be useful for university students. ***- Annex.E.19 (ICES – 2nd Workshop)***

A

5.5 As is the Good Teacher, So Will the Students Be

- As is the master, so will his men be.
- As is the good teacher, so will the students be.
- Train teachers:
  - Training about standards and conformance; about teaching skills
- Network teachers:
  - To exchange information and experience among teachers
- Guest speakers/ Team teaching:
  - Speakers from various sectors including businesses,

5.5 A 5.5 As is the Good Teacher, So Will the Students Be

- How and who start the education activity?
  - The survey reveals that strong leadership by government or standards organization will be the answer to initiate nation-wide education activities.
- Communication with education ministry:
  - It is indispensable to cooperate with education ministry in deploying programs for primary/secondary education; government ministries are best-positioned to communicate with education ministry than any other private organizations.
- Funding/Sponsoring:
  - Government or standards organizations are the first body who could allocate budget formal education about standards and conformance.

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5.6 Leadership and Collaboration needed

à Lessons Learned ß

Standards related organization like a case of Korea, is the best suitable for organizing such education program.
- Annex.E.5 (Korea - KSA – UEPS Program – Lesson #1)
Make consensus of education on standardization among industry, academia, government and standards related organizations. Like a case of Korea, from the very beginning, make consensus of education on standardization by getting financial support from government, by gathering participating universities and by obtaining participating lecturers from industries.
- Annex.E.5 (Korea - KSA – UEPS Program – Lesson #3)
The modules and lesson plans on standards that were prepared by the BPS in cooperation with the Department of Education were designed to be easy to read, situational and interactive.
- Annex.E.2 (Philippines – BPS in DTI)

5.7 Other notable lessons

- Regular report about operation and regular contents update are necessary
- Best method in promotion is ‘use the word of mouth’ by participated students
- Easier access to selected standards could be an excellent teaching tool
- Use website as a databank and a forum among lectures and students
- Make the programs mandatory
- Give training certificate the those who stayed until the last session

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5.7 Other notable lessons

à Lessons Learned ß

Progress and problems should be reported regularly; Learning centres should be established to update the knowledge and information on standardization ***- Annex.E.3. (Thailand – TISI)***

What I would like to see done differently is easier access to selected standards so that students could actually visit sites and study standards that applied to any design(s) they were completing for assignments. So far, this has not been accomplished but I think it would be an excellent teaching tool and would introduce students at an early level to the importance of standards. ***- Annex.E.8 (USA - Faulkner University)***

In order to impress upon the participants that the sessions are very important and that they should complete the whole day session, certificate of attendance was only awarded to those who stay on till the last session of the training. ***- Annex.E.9 (Malaysia – Association of Standards Users)***

Use website as a databank and a forum where students and lecturers can exchange opinions. This can be not only a place where lecture materials can be uploaded and downloaded but also a space where lecturers share lecture materials and related materials as well as communicate with students and lecturers. Students love. ***- Annex.E.5. (Korea – KSA – UEPS – Lesson #5)***

Make the program mandatory. In Korea, some universities are running the program as a mandatory for engineering students or a ABEEK (Accreditation Board for Engineering Education of Korea) certified program. ***- Annex.E.5. (Korea – KSA – UEPS – Lesson #7)***

One of the best methods in promotion is to use the word of mouth among students. To give students who achieve more than a B+ grade a certificate is the one carrot approach.

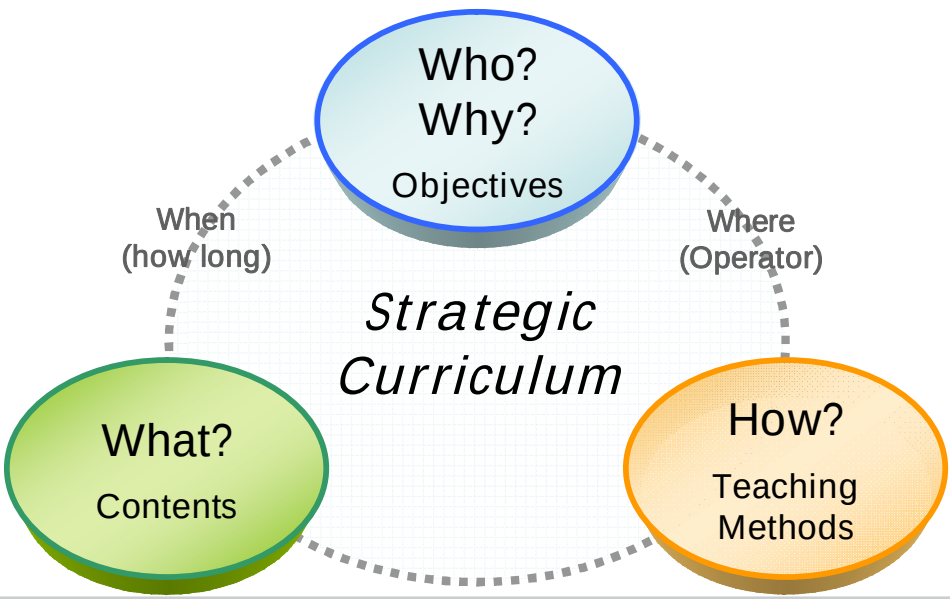
The feedback from the students is a sound basis for analyzing and upgrading the program. Based on the results of the survey, curriculums and lecturers can be rearranged.

Even though the contents of the program are good, if students don’t give a good evaluation, it would be easy to cancel the class. ***- Annex.E.5. (Korea – KSA – UEPS – Lesson #8)***

6. Strategic Curriculum Model

p.28 – p.40

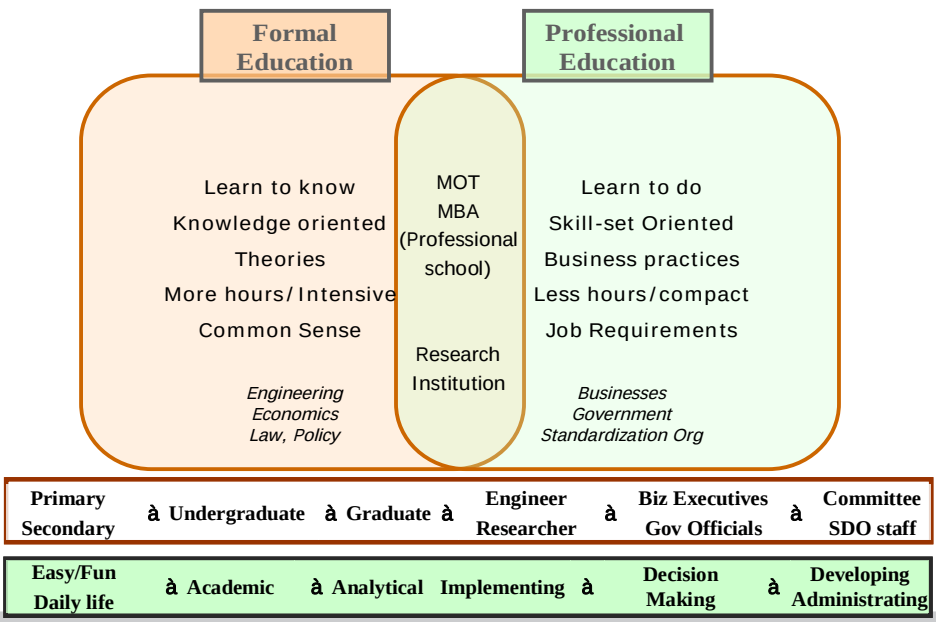
6.1 Components



6.1 Components

- Who/Why? the needs of students and objectives
  - e.g. understand the general importance of standardization; learn how to draft an ISO standard.
- How? the teaching methods including assessment tool
  - e.g. lecture, student presentation, group discussion, role-playing; mid-term exam, term paper, case study.
- What?
  - the contents of education
    - e.g. history of standards, standards and IPR, conformance procedures.
- When? how long
- Where? program initiator and operator

6.2 Who and Why - Objectives



6.3 What – Six Contents in Brief - obstacles

- No standardized classifications
  - same contents, but different title (found many times)
- Duplicative contents in even one textbook
  - Mismatch of chapter title and contents
- Academic or theoretical contents are limited
  - Little academic society
  - Little research activities

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6.3 What – Six Contents in Brief - Findings from 88 practices

- Daily examples and fundamentals of standardization found in most courses:
  - found in all types of education materials
  - from primary/secondary students to professional

  à from daily life examples - importance of standards,

  à Basic/Introductory/Factual/Fundamental information

  à around 40 cases are dealing with these contents

6.3 What – Six Contents in Brief - Findings from 88 practices

- Theoretical aspects of standardization chiefly found in higher education:
  - economics of standardization, standardization and innovation, standards and IPR are commonly found in higher education
  - Case #12, #17, #27, #28, #30
- Case Study chiefly found and expected to be dealt in higher education:
  - usually dealt in higher education, commonly in graduate education. It requires students certain mathematical or analytical ability. Some professional education includes brief case studies as well.
  - #10, #12, #17, #19, #20, 21, #25, #27, #28, #29, #30

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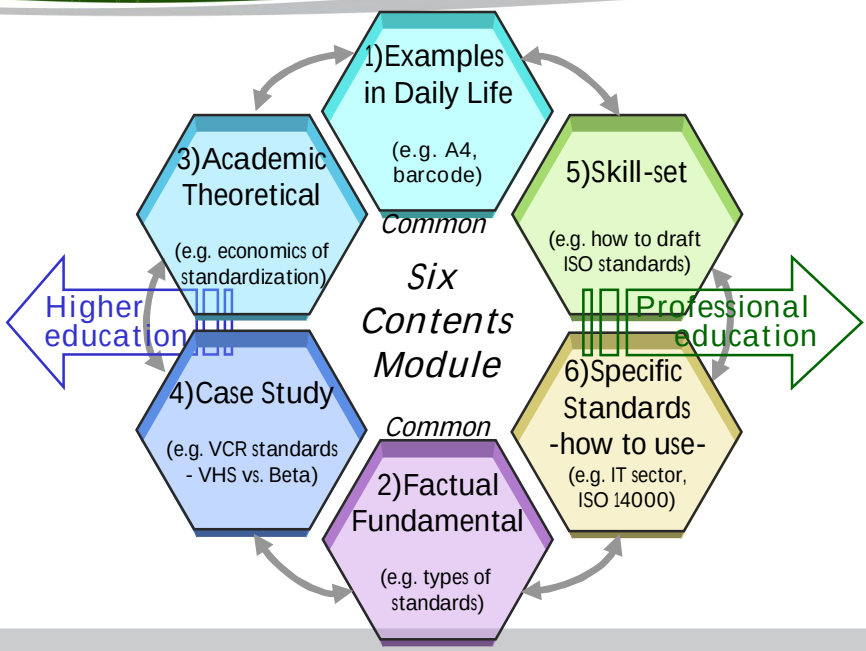
6.3 What – Six Contents in Brief - Findings from 88 practices

- Skill-set mostly found in professional education:
  - the education for skill-set is found mostly in professional education * chapter 4.4 for details
  - Case #45, #49, #52, #53, #57, #70, #78, #86, #99
- Industry/technology specific standards generally found in professional education:
  - about how to use IT technology related standards, or how to apply ISO 14000 are generally found in professional education. However, some engineering departments in universities are also introducing industry related standards.
  - Commonly as a few days of workshop or training course by standards organizations or trade associations

6.3 What – Six Contents Map



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6.3 What – Common Domain

- Common Core Domain includes two centrally located modules:
  - <Module 1> Example standards in daily life related contents and
  - <Module 2> Factual or Fundamental information related contents.
  - We place these two modules in central part of the map as they are common core contents and are considered part of any level of educations.

6.3 What – Higher Education Oriented Domain

- Second, Higher- Education Oriented Domain includes two left located modules:
  - <Module 3> Academic/ Theoretical aspects of standards and conformance related contents, and
  - <Module 4> Case Study of standardization related contents. We place these two modules in left part of the map, as they are commonly found in the courses in higher education, universities.
  - However, you always have freedom to use these higher education oriented modules in professional education, either to meet specific objectives or to increase variety of an education program.

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6.3 What – Professional Education Oriented Domain

- Third, Professional Education Oriented Domain includes two right located modules:
  - <Module 5> Skill-set related contents, and
  - <Module 6> (How to use) Specific Standards related contents. *many introductory course increasingly found in higher education as well
  - We place those two modules in right part of the map, as they are commonly found in the course in professional education.
  - However, you always have freedom to use these professional education oriented modules in higher education, either to meet specific objectives or to increase variety of an education program.

6.4 What – in detail

- All-inclusive List of contents:
  - <Module 2> Factual or Fundamental information related contents.
  - <Module 3> Academic/ Theoretical aspects related contents,
  - <Module 5> Skill-set related contents
- Example List of contents:
  - <Module 1> Example standards in daily life related contents
  - <Module 4> Case Study of standardization related contents.
  - <Module 6> (How to use) Specific Standards related contents

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<Module 2> Factual/Fundamental

- <Module 2> Factual or Fundamental information related contents
  - Definition: factual or fundamental information solely related to standards and conformance itself, and rarely found in other classes.
  - Objective: to raise general awareness about importance and to learn factual/fundamental information in standards and conformance
  - Target Group: for all – primary/secondary, higher, professional
- Projected Contents/Topics:

<Module 2> Factual/Fundamental

Major Classification	Sub-Classification
1.General	General - Introduction, orientation
2. Definitions	Concept and definition
3. Functions (Value)	Needs or objectives
	Functions and Effectiveness
4. History	General History, Evolution
5. Types/Classifications	General
	Who: national, regional, international
	How: De jure, De facto, Consortia/association
	What: Quality, Process, Interoperability, et al
6. National Standardization	History
	Policy, Strategy
	Procedures, Legal System
	Organizations including NSB, NMI, SDOs
	Impact and Challenges
	Major Current Issues

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<Module 2> Factual/Fundamental

7.Regional Standardizatoin (internal)	History
	Policy, Strategy
	Procedures, Legal System
	Organizations
	Impact and Challenges
	Major Current Issues
8.Regional Stanardization (external)	External regions – only where necessary
9.International Standardization	History
	Policy, Strategy
	Procedures, Legal System
	Organizations – formal
	Organizations – non-formal
	Impact and Challenges (Trade and TBT)
	Major Issues
10.Consortia Standarization	General

<Module 2> Factual/Fundamental

11.Company Standardization	Strategy
	Internal standardization
	External standardization
	Consumer needs
12.Conformity Assessment	General
	Types and Strategy
	Procedures, Legal System
	National System – Accreditation
	Other Nations – only where necessary
	International, Regional, Multi/Bi-lateral
	MRA – General
	MRA – Types and Effectiveness
13. Consumer	Users and Consumers
14. Government	Government and Standardization

*** Based on analysis of #17(EU-Asia), #20(ZFIB), #23(DEVCO), #27(KSA-UEPS), #28(Erasmus), #108(ICES) and other professional education curriculum.**

<Module 3>
Academic/ Theoretical aspects related.

- Definition: Interdisciplinary academic contents related to standardization; standardization with traditional academic disciplines such as economics, business management, public administration, law, engineering, science
- Objective: to learn and develop academic aspects of standardization
- Target Group: primarily for higher education
- Projected Contents/Topics:

<Module 3>
Academic/ Theoretical aspects related.

Major Classification	Sub-Classification
General	Academic approach to standardization
History	History and Standardization (academic)
Library/Information Science	Library/Recording Management and Standardization
Human Life Science	Consumer Protection and Standardization
	Social Welfare and Standardization
Education	Education about Standardization
Sociology	Social System and Standardization (academic)
Public Administration	Regulatory Policy and standardization
	Industry/Science Policy and standardization
	R&D Policy and standardization

* Based on analysis of current practices and potential needs.
* Some of the above topics are connected with other modules

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<Module 3>
Academic/ Theoretical aspects related.

Political Science/ Diplomacy	International Trade and Standardization
Law	Law/Legislation and Standardization (academic)
Economics	Economics and Standardization
Natural Science	Natural Science and Standardization
	Natural Science and Measurement Standards
Medicine/Pharmacy	Medicine and Standardization
Business Management	Standardization as a Strategic Tool - Decision Making, Marketing
	Global Business and standardization
	Service Management and Standardization
	Innovation and Standardization
	IPR, Patent and Standardization (Academic)
	MBA - Business Case Analysis <Module4>
Engineering	Technology Management and Standardization
	Technology Transfer and Standardization
	Standardization in all Engineering Disciplines (Mechanical, Construction, ICT, et al) <Module 5>

<Module 6> Skill -set related:

- Definition: Practical skills need in standardization practices in proposing, developing, disseminating, and administrating relevant procedures. Some of them are related to typical business skills like communication, others are solely related to standardization like writing standards
- Objective: to learn how to use and apply particular standard(s)
- Target Group: Primarily for professional education
- Projected Contents/Topics:

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<Module 6> Skill -set related:

- Definition: Practical skills need in standardization practices in proposing, developing, disseminating, and administrating relevant procedures. Some of them are related to typical business skills like communication, others are solely related to standardization like writing standards
- Objective: to learn how to use and apply particular standard(s)
- Target Group: Primarily for professional education
- Projected Contents/Topics:

<Module 6> Skill -set related:

Classification/ Topics
Developing/Drafting standards – template
Communication skills – chairing/moderating a meeting
Communication - Working across cultures – cultural differences
Communication skills – language (English)
Communication skills – consensus, negotiation, discussion
Conformance Skills – test, assessment, and documentation
Administration of standardization activities
Standards Development Procedures – Practices <Module 2>
Standards for technical regulations or legislation (practices) <Module 3>
Specific industry/technology/products/issues standards - overview <Module 5>

* Based on analysis of current practices in professional education.
* Some of the above topics could be partly duplicative with other modules

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<Module 1>
Example Standards in Daily Life

- Definition: Examples we could in everyday life to show that standards are everywhere in our lives and it is vital for safe and efficient society
- Objective: raising general awareness level about the importance of standards
- Target Group: for all – primary, higher, professional education
- Possible contents (The followings are some examples):

<Module 1> Example Standards in Daily Life

Classification/ Topics	
Automotive – Lead Acid Battery	ISBN
Barcode to RFID	JPEG – pictures
Cellular Phone Charger	Measurement Standards
Color	Memory Card Standards
Compact Fluorescent Lamp	MP3 Player
DMB	Paper Size
Wine Glass	Car Airbag

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<Module 4> Case Study

- Definition: Business cases describing different aspects of standard and conformance.
- Objective: to learn and develop practical impacts of standardization in real business practices
- Target Group: Primarily for higher education
- Possible contents (The followings are some examples):

<Module 4> Case Study

Classification/ Topics
Case Study of Agricultural Standards
Case Study of Container Standards
Case Study of Electronic Fee Collection Standards
Case Study of VCR (VHS and Beta)
Case Study of Cell Phone (CDMA vs. GSM)
Case Study of ISO 9000 or 14000

* Simplified <Module 4> Case Study could be used as <Module 1>
* Topics of case study involves specific standards, Industry, technology, or companies.
* Some of the above topics could be partly duplicative with other modules

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<Module 5>
Sector specific standards related:

- Definition: How to use or apply particular standards. Commonly the standards and its explanatory notes are teaching materials.
- Objective: to learn how to use and apply particular standard(s)
- Primarily for professional education (also found in engineering disciplines in higher education)
- Possible contents (Examples):

<Module 5>
Sector specific standards related:

Classification/ Topics
Management Systems Standards – Quality Management and Application
Management Systems Standards – Environmental Management and Application
Chemical Engineering related Standards and Application
Mechanical Engineering related Standards and Application
Service Standards and Applications
Social Responsibility Standards and Application
RFID Standards and Application

* Simplified overview of <Module 5> could be used in other modules
* Topics can be chosen by Industry, technology, products.
* Some of the above topics are connected with other modules

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6.5 How – Teaching Methods

- After identifying what to teach
- it is moment to decide the modality of teaching and students' assessment.
  - Active teaching/learning shifts the focus from the teacher and delivery of course contents to the student and active engagement with the material.
  - Through active learning practices and modeling by the teacher, students drop the traditional role as passive receptors and learn and practice how to capture knowledge and skills and use them.

6.5 How – Teaching Methods

<Level of Activeness>			
	ß Active (Detailed)	Case Study Project Paper/Report (Student) Presentation (Student)	Role-playing Simulation Team Contest Workshop Group/Panel Discussion
	Passive à (General)	Game/Quiz Questioning Sessions Field Trip	Peer Teaching Brain Storming
		Video Lecture	Class discussion
		ß Less Collaborative	More Collaborative à
		<Level of Collaboration>	

6.6. Strategic Curriculum Model Abridged - School

Who -students-	Why - objectives-	Where - operator -	What (Contents)		How -methods-	Good Practices (Annex C)
			-1st-	-2nd, 3rd-		
Pre-School	**Awareness**	**Gov NSBs**	**Module 1 -examples (simplified !)**		**Game Quiz**	**N/A**
Primary/ Secondary Education	**Awareness**	**Gov NSBs**	**Module 1 -examples (simplified)**	**Module 2 (simplified)**	**Contest Camping Quiz Game**	**#7 Turkey #6 Thailand #3 Philippines #8-10 UK**

6.6. Strategic Curriculum Model Abridged - Higher

Who -students-	Why -objectives-	Where - operator-	What (Contents)		How -methods-	Good Practices (Annex C)
			-1st-	-2nd, 3rd-		
Higher Education -Under-graduate	Awareness/ Specialized Knowledge	Gov NSBs SDOs Univ	Module 2 - fundamental Module 3 -academic Module 1 -example	Module 4 Module 5 Module 6	Team Project Presentation Field Trip	#12 CJLU #27 KSAUEPS #28 Erasmus
Higher Education -Graduate	Specialized Knowledge/ Theory	Univ Gov NSBs SDOs	Module 3 -academic Module 4 -case study	Module 6 Module 2 Module 5 Module 1	Case Study Term Paper Workshop	#25 Tokyo Un. #17 EU-Asia #18 PQI #19 Compienge #13 CJLU

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6.6. Strategic Curriculum Model Abridged – Professional

Who -students-	Why -objectives-	Where - operator-	What (Contents)		How -methods-	Good Practices (Annex C)
			-1st-	-2nd, 3rd-		
Professional Education -Gov -Executive	Strategic Decision/ Policy Development	NSBs SDOs Gov	Module 2 - fundamental Module 3 -academic Module 4 -case study (Abridged!)	Module 1 Module 5 Module 6	Workshop Panel Discussion	#67 TISI(gov) #89 ANSI(gov)
Professional Education -Committee Members -SDO staff	Practical Skills or Ability	NSBs SDOs Gov	Module 5 -skill-set	Module 4 Module 3 Module 2 Module 1 Module 6	Simulation Role Paying Workshop	#48 ISO online #49 ISO training # many bust not listed all here
Professional Education -Engineer -Researcher	How to use Specific Standards	Biz Univ R&D	Module6 -standards	Module 4 Module 3 Module 2 Module 1 Module 5	Experiments Practices	Not included in this Case Study, but many are operated by NSBs and SDOs

Phase I Review: background

- Recognizing that the formal education on standards and conformance is at its beginning stage and;
- that guideline for the education policy and program is useful handbook for all member economies

Phase I Review: contents

1. Background and Objectives
2. Methodology and Definitions
3. Case Study of Policy and Strategy
4. Case Study of Education Practices
5. Case Study of Surveyed Lessons
6. Strategic Curriculum Model
7. Future Challenges

Phase I Review : Reference Model

- Not attempt to provide a perfect model suitable for all economies whose conditions are diverse
- but this guideline endeavors
  - to provide realistic and investigative systematic information based on case studies and
  - to advise desirable framework and components, primarily focusing on formal education but not limited to,
  - you could selectively use or refer to.

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APEC Project Phase II, III - Plan

KSA 한국표준협회

Phase II – Phase I plus

- Mar 2008 to Oct 2009
- Website
  - Policy and Strategy
  - Curricula, Syllabus, Modules
  - Operation know how
  - Lessons Learned
  - Online Café - Network (contact information)
- APEC Academic/Teacher's Network
  - Academic community to discuss and publish academic/theoretical deliverables à contents!!
  - Sharing Teaching experiences

Phase II – Textbook and Teaching Manual

- Textbook
  - <Module 5> Case Study
  - <Module 3> Academic/Theoretical
  - <Module 2> Factual/Fundamental *editing
  - <Module 1> Daily Examples *editing
  - Academic-Professional Format
- Teaching Manual
  - Teaching/Testing Methods/Tips
  - Reference list

Phase III – Pilot Implementation (first sketch)

- Pilot implementations
  - Eight Universities in APEC economies
  - Common Textbook with flexibility

  à Lesson Book and Diversity
- Diversity
  - Undergraduate and Graduate
  - Engineering, Economics, Management, Administration, MOT, MBA, et al
- To be discussed in 2009

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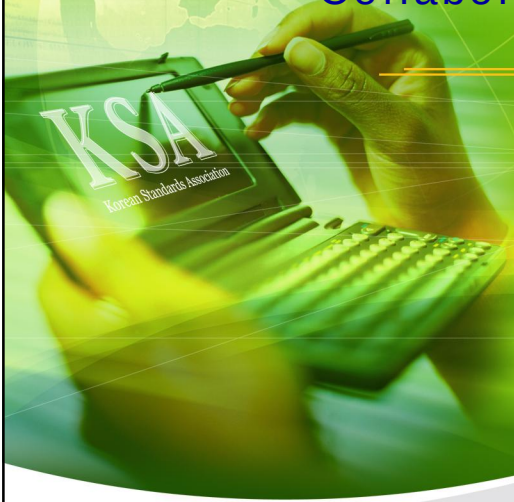
Collaboration Ideas



to Textbook

- Textbook Development (phase II)
  - Academic/ Theoretical Contents
  - Case Study contents
  - Factual/Fundamental contents
  - Copyright issues: Other (Existing) Contents
- Interested Organizations or Individuals
  - Voluntary or Cooperative approach basis

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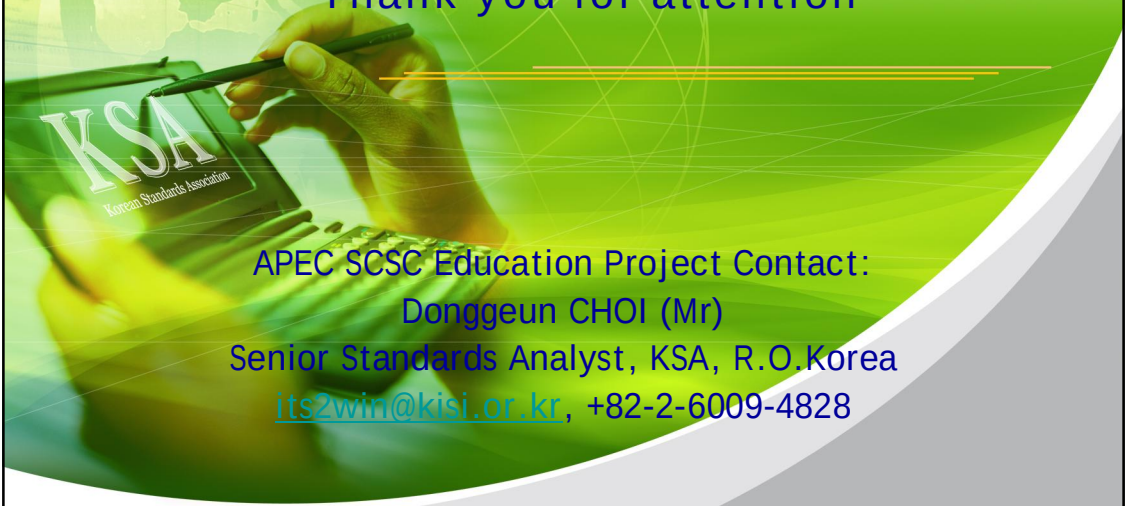
to APEC SCSC Conference

- APEC SCSC 7th Conference
  - August 10-11, Cuzco, Peru
  - Session2: Education
  - Peru and Korea
- Topic: Textbook
  - Case Study
  - Academic Discipline
  - Online Approach
  - To be proposed and discussed on Feb 24-26 in APEC SCSC meeting, Lima, Peru

Formal Liaison Relationship

- Good Venue for interested parties to share ideas and exchange practices
- Proposing ICES to consider to set up a formal liaison concept in their strategy
- Willing to serve as liaison between ICES-APEC SCSC in terms of standards education

Thank you for attention



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